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U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

ENVIRONMENTAL ASSESSMENT FOR ALARON CORPORATION

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1.0 BACKGROUND AND INTRODUCTION

The U.S. Nuclear Regulatory Commission (Commission or NRC) is considering an amendment of Materials License Number 37-20826-01 for ALARON Corporation, which operates a radioactive waste storage and handling facility in Wampum, Pennsylvania. ALARON, in letters to NRC dated February 27, 1987, May 15, 1987 and December 1, 1987, requested to amend its NRC License Number 37-20826-01. In accordance with the Commission's regulations, Title 10, Code of Federal Regulations, Part 51 (10 CFR Part 51), NRC prepared this environmental assessment. The Pennsylvania Department of Environmental Resources (PADER), as the regulatory authority for the State of Pennsylvania, will be using this environmental assessment in connection with its evaluation for siting regulations.

1.1 DESCRIPTION OF THE PROPOSED ACTION

ALARON, under its license issued by NRC, is permitted to receive radioactively contaminated metal items in the form of equipment, components, structural steel, and other similar items for the purpose of decontamination for unrestricted release. The waste is transported to the ALARON Regional Service Facility where it is inventoried, stored (up to two years), maintained, repaired and decontaminated. If complete decontamination of equipment is possible, it is returned to the customer; if not, it is subsequently transported to a licensed disposal site for burial. For waste which is used by the licensee in performance of tasks authorized by the license, there is no restriction of the two-year time limit for possession, provided ALARON maintains a separate current inventory of all such items. ALARON is currently licensed to utilize a drum compactor (manufactured by Consolidated Bailing Machine Corporation), at its warehouse, to package waste resulting from currently licensed activities (decontamination of equipment) and to prepare for shipment to a licensed radioactive waste disposal site.

ALARON's requested amendment, (the subject of this environmental assessment), includes capability to accept and open radioactive wastes containing mixed contents of dry, solid uncompacted materials, in order to reduce in volume (compact) and repackage them. The uncompacted waste to be processed through the compactor is categorized as: dry low specific activity (LSA) waste, as defined in 49 CFR Part 173; Class A waste, as defined in 10 CFR Part 61, and packaged typically in 52- or 55-gallon drums (strong tight containers) meeting the Department of Transportation (DOT) regulations. The waste could be received and stored onsite for up to two years. The facility throughput is expected to be 75[illegible]00 cubic feet of compactible dry active waste (DAW) annually. The volume-reduced DAW would be sent by truck to a licensed disposal facility.

The environmental impacts of ALARON's radioactive waste brokerage operations (i.e., receipt, storage of pre-packaged low-level radioactive waste (LLW) waste, and compacting dry solid DAW wastes incident to transfer to authorized waste disposal facilities) are assessed based on the requested possession limit of 100 curies and an interim storage period for up to two years.

1.2 NEED FOR THE PROPOSED ACTION

In recent years, there has been much uncertainty about the availability of the three existing LLW disposal sites as States proceed with plans to develop regional LLW disposal sites in accordance with the Low-Level Radioactive Waste Policy Act of 1980 (Public Law 96-573; 42 U.S.C. 2021b, et seq.). This uncertainty has sensitized generators of radioactive wastes to the need to minimize the amount of LLW held awaiting disposal. ALARON has realized an increased demand for a LLW brokerage service. Thus, ALARON has requested the capability to accept and repackage LLW from other licensees that generate radioactive waste. This would allow ALARON to decrease the overall LLW volume of radioactive materials requiring burial in disposal sites.

2.0 FACILITY ENVI)NMENT AND OPERATIONS

2.1 SITE DESCRIPTION

ALARON Corporation is located at Point Industrial Park, Route 18, New Beaver Borough, Wampum, Pennsylvania (Figures 1 and 2), about 50 miles northwest of Pittsburgh, Pennsylvania. The facility is located in a light industrial park consisting of approximately nine buildings. The industrial park is bounded by agricultural lands to the west and north and residential dwellings to the north, south and east. The nearest residential buildings are about 0.2 mile to the north and 1.0 mile southwest of the ALARON facility. Adjacent to the ALARON property is a tractor/trailer repair garage about 30 yards north, two coal processing plants about 30 yards east, and a test equipment manufacturer about 70 yards east. Behind the facility, to the south, is a scrap yard. Figure 2 shows the locations of other principal facilities, listed in Table 2-1, within two miles of ALARON.

The nearest large body of water to ALARON's facility is the Beaver River, which runs from north to south approximately 0.3 miles east of ALARON. Groundwater in the area is typically used as a source of water consumption.

The climate in the vicinity of ALARON is typically continental with moderately cold winters and warm humid summers. Local topographic features do not significantly affect the climate. Meteorological data for Beaver and Lawrence counties indicate that a tornado of sufficient force to cause major structural damage has occurred in the area once in the past one-hundred years. Tornado frequency at the site is similar to that expected for all of Pennsylvania, which is typical of Mid-Atlantic states. The region is classified by NRC as being in Tornado Intensity Region I, as defined in Regulatory Guide 1.76, "Design Basis Tornados for Nuclear Power Plants."[1] For purposes of this as')ssment, meteorological data used to estimate atmospheric dispersion factors were taken from the Updated Final Safety Analysis Report[2] for the Beaver Valley Unit 2 facility located approximately 20 miles southwest of ALARON.

The estimated total effective dose equivalent rate from various sources of natural background radiation of the region, as presented in NCRP 94 "Exposure of the Population in the United States and Canada from Natural Background Radiation," is 300 mrem per year.[3]

2.2 FACILITY DESCRIPTION

ALARON property consists of approximately 13 acres, nine of which are controlled via a six foot chain-link barbed-wire fence enclosure. The remaining four acres are currently undeveloped, wooded and are adjacent to the south and west fence line. The main process building consists of a four-inch poured concrete floor (14,000 ft^2) including an office area (1200 ft^2). The walls are 18 feet high constructed with 12-inch-wide concrete blocks, while the wooden roof, domed in shape, is 30 feet high in the center. Within that structure, there exists several smaller containment enclosures, including glove box abrasive blast units, tents, and a free-standing metal building. Each of these internal structures is independently ventilated with high efficiency particulate air (HEPA) filtration modules and the effluents are continuously monitored. The front portion of the building (about 20 percent) consists of offices, a lunch room, and a radioactivity counting room which is used by the administrative and technical staff. The remainder of the building is used as a warehouse where staging and repackaging the LLW occurs. The site includes a storage area behind the building and is surrounded by a chain-link barbed-wire fence enclosure. Within the fenced area are three storage buildings, the main building, two railroad spurs and the loading dock.

2.3 OPERATIONS DESCRIPTION

Radioactive waste packaging instructions are provided to all customers that generate waste. No liquid radioactive waste will be included in this process. After placing the waste into an approved DOT container (typically a 8'x8'x20' Sea Van-type container), the customer contacts ALARON to ship the containers back to the warehouse. ALARON Corporation's principal customers are from the nuclear power plant industry. However, a small percentage of the waste to be processed will originate from other facilities whose waste streams are generated as a result of activities within the nuclear fuel cycle.

After confirmation of the manifest by the customer's technical personnel, the shipment is transported to the warehouse, where it is inventoried. The pallets containing the waste are loaded onto the dock located on the west side of the warehouse (see Figure 3). Unloading takes place in the shipping/receiving area. Packages of radioactive waste are moved by forklift to one of several staging areas.

ALARON expects to receive waste as a mixture of compactible trash (i.e., plastics, papers, cardboard, etc.) and metals (which can be decontaminated). The first phase of the segregation entails the physical separation of the two types of material. Metals are further separated based on contamination levels for the best utilization of the decontamination processes. Trash will be placed into plastic bags as necessary, dose-rated, and compacted into drums. ALARON will not survey and segregate radioactive material from non-radioactive trash.

The compactor used at this facility is a Consolidated Baling Press, Model DOS-RAW-W, with a Model PFB(H)-100 Portable Filtration system by General Dynamics Services Company. This equipment is used only to compact dry, uncompacted DAW, as contained in cardboard boxes, fiberboard, steel drums, or sea van containers. The compactor off-gases are exhausted through a pre-filter and HEPA filter before being discharged to the environment. For further details on the ventilation and environmental monitoring systems, see Section 4.2, "Effluent Control."

Pallets carrying the compacted waste would then be transferred to a truck by forklift. When shipping and disposal manifests are complete, a radiation survey is performed. After meeting all necessary regulatory transportation requirements, the truck would be released to transport the LLW to the licensed disposal site.

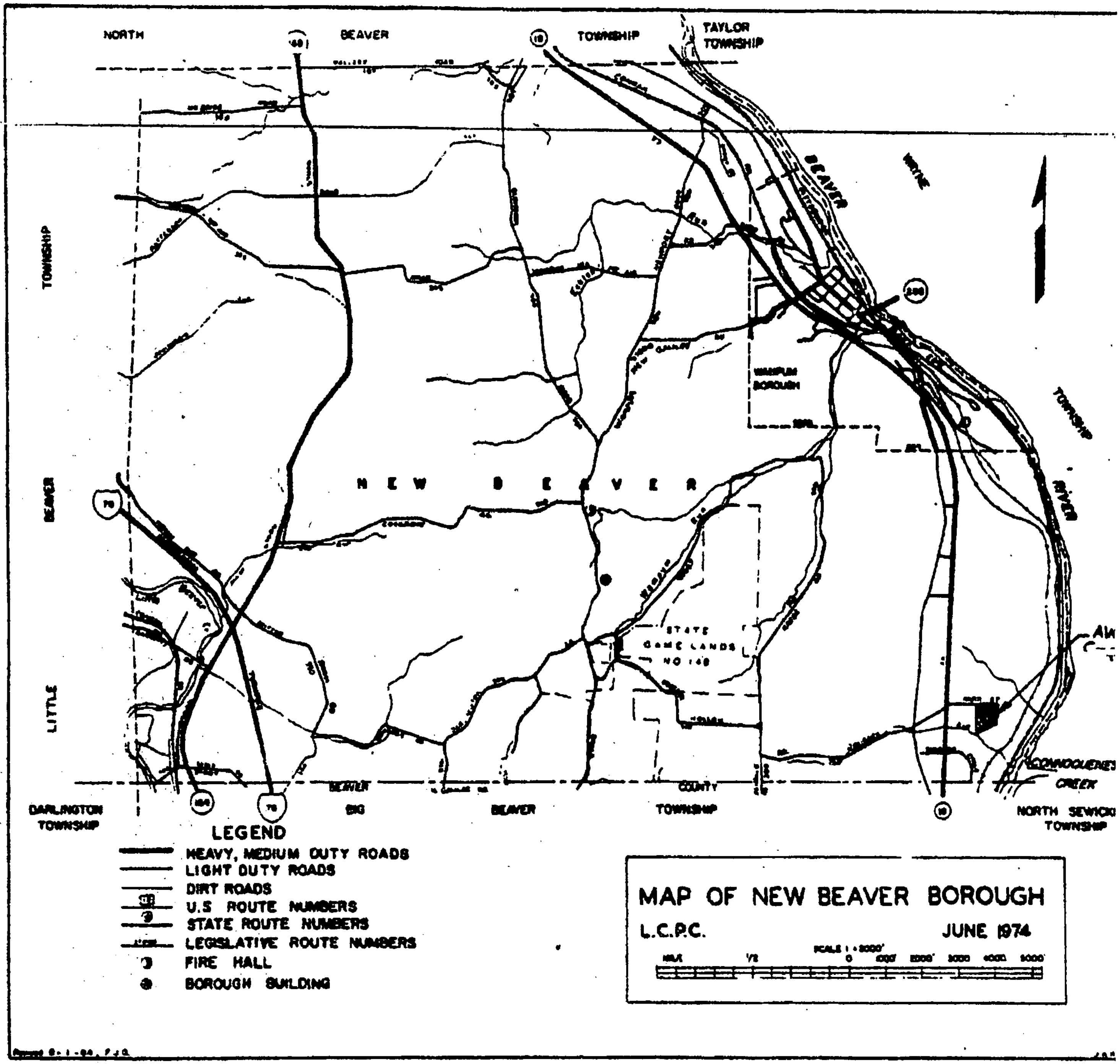

FIGURE 1: GENERAL LOCATION OF NEW BEAVER BOROUGH, WAMPUM, PENNSYLVANIA

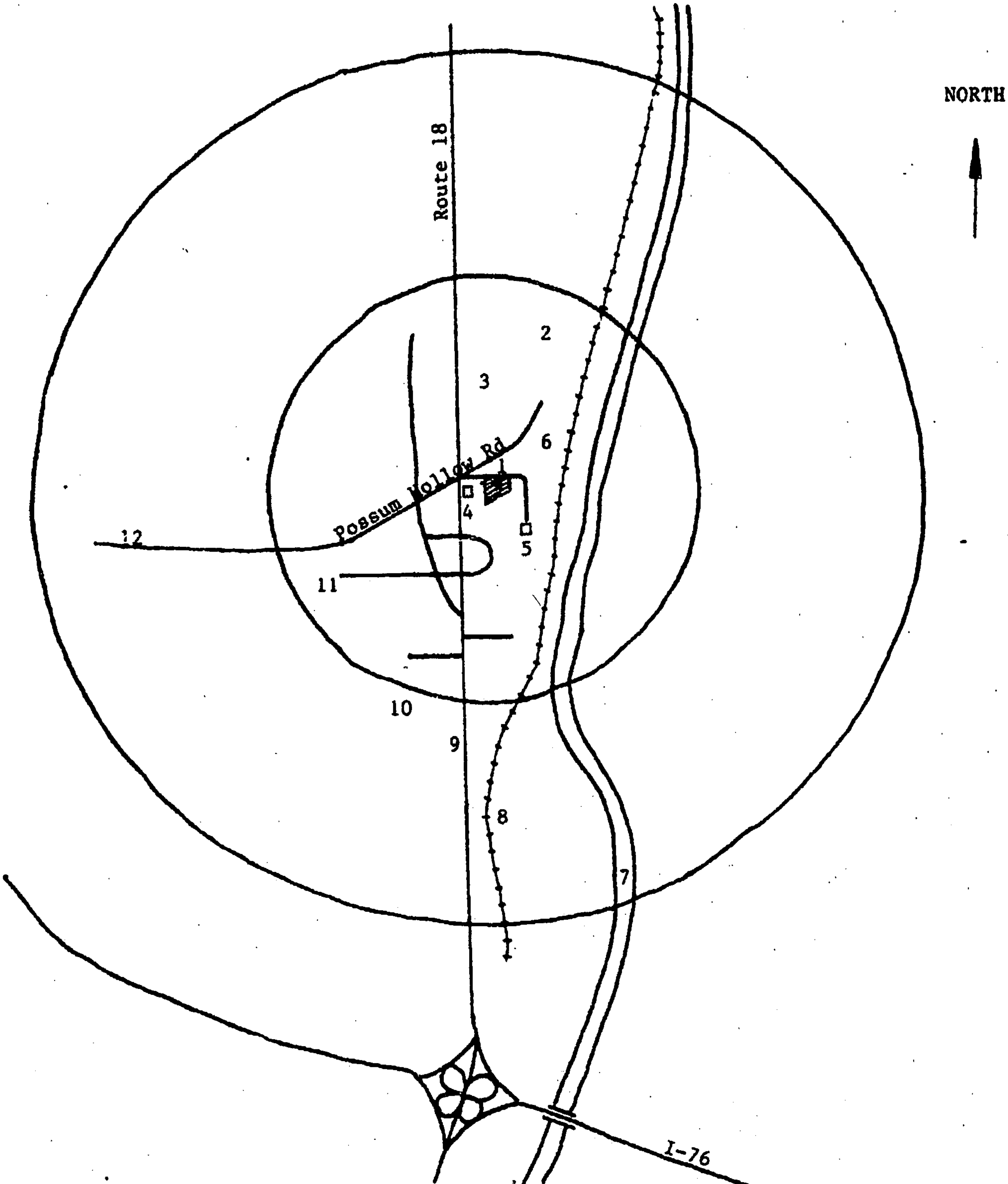

FIGURE 2: LOCATION OF PRIME EVACUATION FACILITIES WITHIN ONE AND TWO MILE RADIUS OF ALARON

TABLE 2-1: PRIME EVACUATION FACILITIES WITHIN A TWO MILE RADIUS OF ALARON

LOCATION NUMBER	AREA DESCRIPTION	DIRECTION	DISTANCE
Center (Shaded Area)	ALARON Corporation Facility		
1	Tractor/Trailer Repair Garage*	North	300 Feet
2	Golf Course	North	2100 Feet
3	Single Family Dwellings** (Approximately 10)	North	1000 Feet
4	Manufacturing Company	West	700 Feet
5	Scrap Yard	South	700 Feet
6	Coal Processing Plants (2)	East	300 Feet
7	Beaver River	East	1700 Feet
8	Conrail Railroad Tracks	East	1000 Feet
9	Town of Koppel Population 1150	South	1.3 Miles
10	Sheep Farm	Southwest	1.0 Mile
11	Electrical Substation	Southwest	3500 Feet
12	Farm Land	West	1.2 Miles

*Nearest Offsite Facility (90 meters)
**Nearest Residence (300 meters)

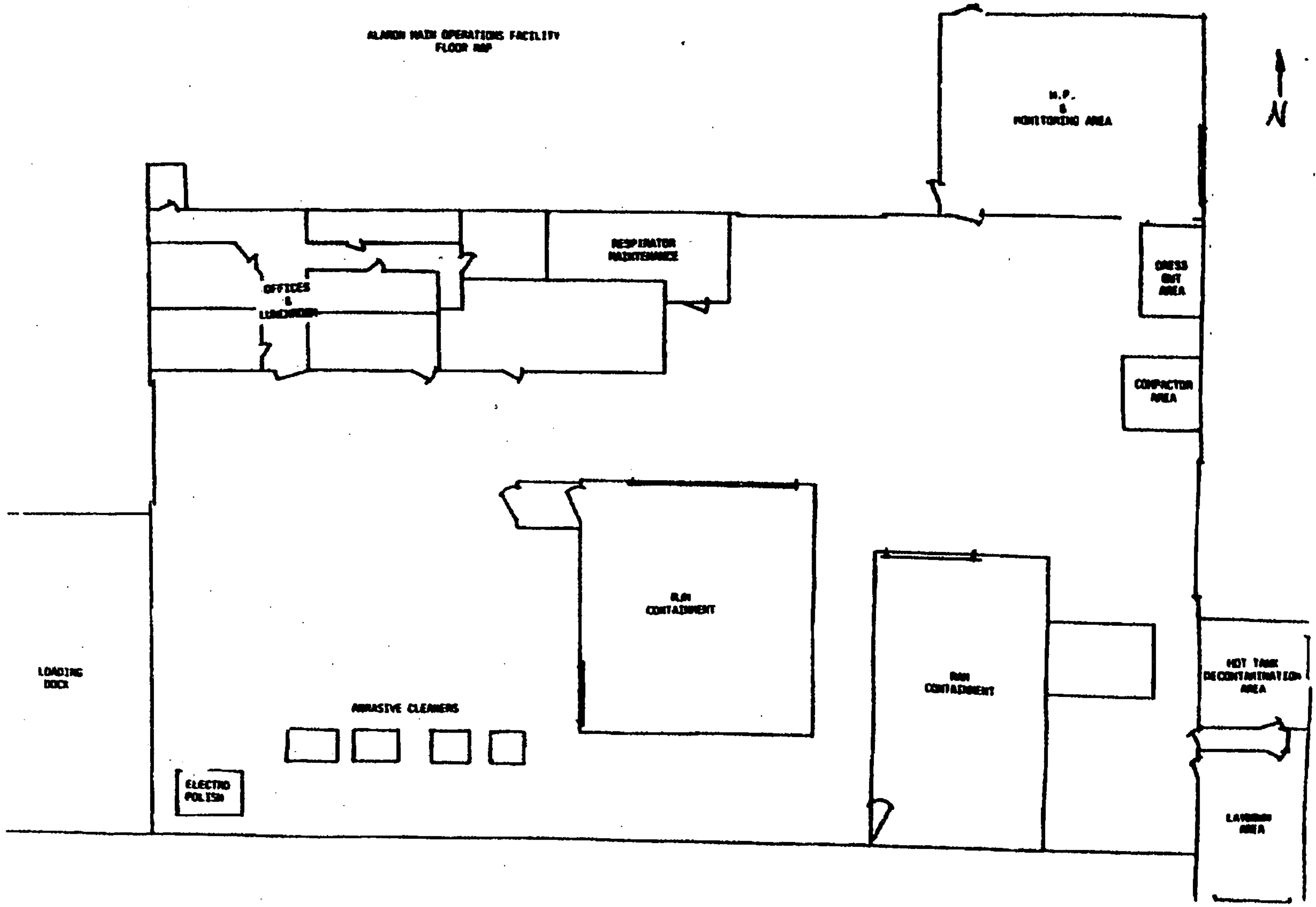

FIGURE 3: ALARON FACILITIES WAREHOUSE

2.4 TRANSPORTATION TO AND FROM ALARON

All LLW from generators are transported to ALARON on local, State and Federal highways. Based on the estimated increased incoming and outgoing DAW volumes from ALARON, approximately one truck shipment would be expected each month. Since local roadways are currently heavily traveled by steel and coal industry traffic, an additional truck shipment per month due to ALARON's operations is not expected to be noticeable among existing traffic on local roads leading to the Interstate highways.

3.0 CHARACTERIZATION OF INCOMING WASTE

3.1 WASTE GENERATORS

ALARON accepts waste shipments mainly from the nuclear power plant industry. The types of wastes generated range from metals contaminated with C-14, Co-60, Cs-134, Cs-137, Fe-55, H-3, Mn-54, and Ni-63 to pieces of plastics, wood, and paper products.

3.2 WASTE VOLUMES AND ISOTOPIC COMPOSITION

This environmental assessment is based on the types of waste ALARON currently handles, adjusted to reflect the increased volume of DAW. The physical size of the facility effectively restricts the volume of waste possessed and, to an extent the amount handled. Based on ALARON monthly inventory records from November 198" to December 1988, an average inventory projecting the increased volume of DAW was developed. Table 3-1 represents all radionuclides from the various categories with amounts in excess of 0.1 percent of the total waste volume. The characterization of the dry radioactive wastes is estimated to represent a mix of 75 percent reactor wastes and 25 percent industrial/institutional wastes.

Most of ALARON's waste volume is processed as soon as the container is received at the facility. In the anticipation of increased volumes of DAW, if the waste cannot be processed immediately, it will be stored until a full offsite shipment to suitable disposal facility can be made. All LLW are not to be retained on site for more than two years. Because scintillation vials, liquids, and sealed sources are not accepted at the ALARON facility, they are not considered a potential source of release.

It is estimated that approximately one-fifth of the present possession limit is comprised of contaminated metal equipment. Typically, this metal material consists of tools, piping (carbon, stainless, etc.), valves, pumps, tanks, and scaffolding. Currently, these contaminated metals make up about 40 percent of the total waste volume. In order to reduce burial costs, decontamination operations are performed by a combination of several cleaning mechanisms, including abrasive cleaners and electropolishing units in a containment area and obtains an overall (volume and activity) reduction factor of about 80 percent.

Based on waste shipments from 1987-88, the annual throughput volumes were estimated to be approximately 40 percent contaminated metals and 60 percent DAW. The inventory volumes and activities projected for increased volume of DAW are shown in Table 3-2. These projected waste output volumes were based on the assumption that the volume of contaminated metal received at ALARON would remain the same, while the DAW volume would increase an additional 35 percent. Because the maximum volume of DAW to be processed at ALARON is approximately 75,000 ft^3 per year, and the average reduction in waste volume is 80 percent, an estimate of the incoming DAW would be 375,000 ft^3.

Table 3-2 shows that the contaminated metals received at ALARON currently represent about 16 percent of the total possession limit in activity. Since the

TABLE 3-1. RADIOACTIVE WASTE CHARACTERIZATION, VOLUMES, AND ACTIVITIES

	CURRENT VOLUMES AND ACTIVITIES*				PROJECTED VOLUMES AND ACTIVITIES PER MONTH				
	PERCENT VOLUME (%)	VOLUME (FT³)	PERCENT ACTIVITY (%)	AVERAGE ACTIVITY (Ci)	PERCENT VOLUME (%)	INCOMING VOLUME (FT³/MO)	OUTGOING VOLUME (FT³/MO)	INCOMING ACTIVITY (Ci/MO)	OUTGOING ACTIVITY (Ci/MO)
INVENTORY	100.00%	7.49E+03	100.00%	4.42E+00	100.00%	3.13E+04	6.25E+03	8.33E+00	8.33E+00
DRY RADIOACTIVE WASTE	56.76%	4.25E+03	83.20%	3.68E+00	95.00%	2.97E+04	5.94E+03	6.93E+00	6.93E+00
H-3	0.54%	4.02E+01	0.12%	5.30E-03	0.90%	2.82E+02	5.65E+01	1.00E-02	1.00E-02
C-14	0.07%	5.42E+00	0.03%	1.33E-03	0.12%	3.66E+01	7.32E+00	2.50E-03	2.50E-03
Cr-51	0.01%	5.60E-01	0.01%	4.42E-04	0.02%	5.23E+00	1.05E+00	8.33E-04	8.33E-04
Mn-54	0.83%	6.22E+01	1.68%	7.43E-02	1.39%	4.34E+02	8.68E+01	1.40E-01	1.40E-01
Fe-55	10.12%	7.57E+02	24.99%	1.10E+00	16.94%	5.29E+03	1.06E+03	2.08E+00	2.08E+00
Ni-59	2.45%	1.83E+02	1.73%	7.65E-02	4.10%	1.28E+03	2.56E+02	1.44E-01	1.44E-01
Ni-63	3.83%	2.87E+02	4.18%	1.85E-01	6.41%	2.00E+03	4.01E+02	3.48E-01	3.48E-01
Co-58	0.36%	2.69E+01	0.35%	1.55E-02	0.60%	1.88E+02	3.77E+01	2.92E-02	2.92E-02
Co-60	20.93%	1.57E+03	37.03%	1.64E+00	35.04%	1.09E+04	2.19E+03	3.09E+00	3.09E+00
Zn-65	6.29%	4.72E+02	4.70%	2.08E-01	10.53%	3.29E+03	6.58E+02	3.92E-01	3.92E-01
Ag-110m	0.22%	1.65E+01	0.18%	7.96E-03	0.37%	1.15E+02	2.30E+01	1.50E-02	1.50E-02
Cs-134	0.76%	5.75E+01	0.50%	2.21E-02	1.27%	3.98E+02	7.95E+01	4.17E-02	4.17E-02
Cs-137	9.54%	7.15E+02	7.52%	3.32E-01	15.97%	4.99E+03	9.98E+02	6.27E-01	6.27E-01
Pu-241	0.01%	7.10E-01	0.01%	4.42E-04	0.02%	5.23E+00	1.05E+00	8.33E-04	8.33E-04
DU-238**	0.79%	5.94E+01	0.18%	7.96E-03	1.32%	4.13E+02	8.27E+01	1.50E-02	1.50E-02
CONTAMINATED METALS	42.81%	3.20E+03	16.46%	7.28E-01	5.00%	1.56E+03	3.13E+02	1.37E+00	1.37E+00
H-3	0.26%	1.95E+01	0.09%	3.98E-03	0.03%	9.51E+00	1.90E+00	7.50E-03	7.50E-03
C-14	0.04%	2.75E+00	0.01%	4.42E-04	0.00%	1.46E+00	2.93E-01	8.34E-04	8.34E-04
Mn-54	0.16%	1.22E+01	0.04%	1.77E-03	0.02%	5.85E+00	1.17E+00	3.33E-03	3.33E-03
Fe-55	0.45%	3.35E+01	0.03%	1.33E-03	0.05%	1.65E+01	3.29E+00	2.50E-03	2.50E-03
Co-60	13.07%	9.79E+02	4.75%	2.10E-01	1.53%	4.78E+02	9.56E+01	3.96E-01	3.96E-01
Cs-134	0.21%	1.56E+01	0.06%	2.65E-03	0.02%	7.68E+00	1.54E+00	5.00E-03	5.00E-03
Cs-137	9.21%	6.90E+02	4.39%	1.94E-01	1.08%	3.37E+02	6.73E+01	3.66E-01	3.66E-01
DU-238**	19.40%	1.45E+03	7.08%	3.13E-01	2.27%	7.09E+02	1.42E+02	5.90E-01	5.90E-01

*BASED ON ALARON'S INVENTORY RECORDS FROM 1987-88.
**DU = DEPLETED URANIUM

volume of metals received will most likely remain constant, the projected volume of metals for projected activities would be approximately 5,000 ft^3 divided by 375,000 ft^3, or 1.3 percent. To allow for some conservatism in these projections, 5 percent was used (rather than 1.3 percent) as the percent volume of metals for future activities. The only potential sources for airborne emission of radioactive material to consider for this environmental assessment are from the compacted DAW wastes.

3.3 END PRODUCTS

The ALARON end product will be compacted material, packaged in either 52- or 55-gallons drums, or metal boxes. The end product would be shipped from ALARON for appropriate disposal.

TABLE 3-2

ALARON WASTE CHARACTERIZATION FOR PROJECTED ACCEPTANCE OF DRY ACTIVE WASTE

	PERCENT VOLUME (%)	TOTAL VOLUME (FT3)	TOTAL ACTIVITY (Ci)	OUTGOING ACTIVITY (Ci/MONTH)
INVENTORY	100	2.53E+04	100	----
CONTAMINATED METALS	5	1.25E+03	17	1.37E+00
DRY RADIOACTIVE WASTE	95	2.38E+04	83	6.93E+00

4.0 WASTE CONFINEMENT AND EFFLUENT CONTROL

4.1 WASTE CONFINEMENT

Waste confinement refers to the physical limits and administrative procedures used to keep the waste within specified boundaries. ALARON uses a combination of several administrative techniques, as well as physical parameters, to contain radioactive material waste in the truck, building, compactor or drum.

4.1.1 TRANSPORTATION

All LLW is shipped to ALARON by truck. Before shipping, the first level of confinement is provided by the waste containers. These containers meet applicable DOT regulations. The second level of confinement includes the tie-downs on the truck trailer bed, as well as the shipping trailer walls and roof. Before leaving for the ALARON warehouse, the truck is checked for external contamination and radiation levels, as required by 10 CFR Part 20.

The waste containers continue to provide confinement during the off-loading and staging process at ALARON. Containers are separated according to their category (DAW or contaminated metal) and moved to their respective staging areas located within the warehouse (see Figure 3).

Storage space for the compacted DAW waste is provided in a storage building located southwest of the ALARON facility. There is space to store approximately 800 drums (approximately five trailer loads) for waste storage. Each trailer can hold about 150 55-gallon drums.

4.1.2 METAL WASTE

ALARON expects to receive waste as a mixture of compactible trash (DAW) and metals which can be decontaminated. The first phase of segregation entails the physical separation of the two types of material. Metals are further separated based on contamination levels, for the best use of decontamination processes. The metals are then placed inside one of several containment structures, for further processing and decontamination.

4.1.3 COMPACTOR

ALARON receives and processes waste in several different types of containers that are used to transport the waste from the generators to their waste facility. In addition to the Sea Van Containers, B-25 and B-12 LSA waste containers (manufactured by Container Products Corporation) are also used for compacted waste. The other container type used to transport waste are 52- and 55-gallon steel drums. These drums contain waste which has been packaged in four-mil polyvinylchloride liners.

Once the waste (containing the uncompacted dry, solid waste) is segregated from the metals, the compaction process begins. Before any operations are initiated, all radioactive waste containers are inspected thoroughly, by the quality control manager, for cracks, holes, or other deficiencies. When the drum is found to be free of defects, it is placed on the compactor dolly and filled with the waste. Then the drum is rolled into the cabinet directly underneath the compactor head, and the compactor door is closed. Although the waste container confines the bulk of the waste, some of the radioactive material may be expelled from the container during compression, so it is filtered and continuously monitored for beta and gamma particulates in the exhaust vent before being released out the rear of the building. For more information on the system's ventilation control program, see Section 6.0, "Description of Environmental Monitoring Programs."

In summary, the radioactive waste confinement during the compaction operations is primarily provided by the compactor, secondly by the inner containment building, and thirdly, by the outer main building.

4.2 EFFLUENT CONTROL

Sections 4.2.1 through 4.2.3 describe the potential sources of radioactive effluent at the ALARON waste-processing facility. The equipment and operations to manage those effluents are also described. The environmental effects that could result from these effluents are described in Section 5.0, "Environmental Impacts of the Proposed Action."

4.2.1 LIQUIDS

As mentioned in Section 3.2, bulk liquids containing radioactive and deregulated quantities of materials are not processed at ALARON. As a consequence of decontamination, however, a small amount of liquid waste may be generated and would be solidified and packaged according to radiation safety procedures already in use. This type liquid must be solidified such that the final product is a free-standing monolith, with no detectable liquid in excess of 0.5 percent waste volume of non-corrosive liquids per container. Specific radiological procedures for solidifying liquids are outlined in ALARON document RSF-HP-10, "Packaging of Radioactive Waste." In addition, ALARON's concrete warehouse floor has no drains to provide for a release pathway to the environment.

4.2.2 SOLIDS

The compacted wastes are sealed in DOT-approved 52- and 55-gallon drums and placed on pallets, which are stacked up to two high. These pallets are stored in the southwest storage area outside the facility and along the south wall of the main building, awaiting shipment to a disposal site (maximum storage for DAW is two years).

4.2.3 GASES

The principal potential source of release of airborne radioactive material at ALARON is from the compacting operations. This results from the entrainment of radioactive material in air that would be expelled from the drums during compression. Upon closing the compactor door, the filtering system is automatically activated and remains on throughout the compaction operations, until the door is re-opened again. The Baling Press, Model DOS-RAW-W has a filtration module attached that includes a prefilter and a 99.97 percent (0.03 micron or greater) particulate removal efficiency HEPA filter.

- To assure that no radioactive airborne contamination enters the operations room during compaction, rubber gasketed filters are placed between the compactor and the filter system. In addition, three inner containment buildings are either continuously monitored for both particulates and gases (while occupied) or hourly monitored for particulates.

4.3 ADMINISTRATIVE CONTROLS

The ALARON facility is divided into restricted and unrestricted areas, as required by 10 CFR Part 20. The restricted areas comprise the compactor area, and sorting and staging areas as well as the outside areas used to store the contaminated metal wastes. Radiation areas are posted with the appropriate radiation warning signs as described in 10 CFR Section 20.203.

The radiation safety personnel employed by ALARON wear protective clothing, as required by the specific radiation work permit (RWP) for both the compaction and decontamination operations. In containment work areas, hourly air samples are taken in the breathing zone areas of the individuals performing the work. Continuous air monitors are also on during these operations, to assure that airborne radioactivity is kept within the maximum permissible concentrations (MPC's). These continuous samples are taken on a continuous or hourly basis, depending on what type of activities are being performed.

Contamination surveys are performed routinely for the various different aspects of the staging process. Wipe test samples are conducted for transportation, compaction, and warehouse operations on a daily basis as needed. In addition, the unrestricted areas are surveyed weekly for contamination and background radiation levels.

A computerized radioactive waste container tracking system is used to administratively track and classify processed material as it is shipped from the generators. This system processes and is the basis for maintaining the record-keeping system in order to prepare the manifests required for waste shipments, as required by 10 CFR Section 20.311.

5.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

The radiological and nonradiological impacts that would result from normal facility operations and associated transportation activities are discussed in this section. The methodology for atmospheric dispersion analysis and radiation dose assessment for facility operations were the same used in the Babcock and Wilcox Environmental Assessment of their Volume Reduction Services Facility.[4] Environmental impacts from potential releases from the proposed additional operations were assessed for a mixture of 75 percent reactor wastes and 25 percent industrial/institutional wastes. Radiological impacts would include exposures resulting from airborne effluents, direct radiation exposures to the workers and surrounding population, and exposures resulting from normal, incident-free transportation of the LLW.

ALARON's inventory records for the period November 1987 to December 1988 were used to estimate average waste volumes in and out of the facility and to compile an average inventory list. Based on these average volumes, Table 3-2 was generated to reflect the increased volume of DAW that could be expected at the waste processing facility. Throughput for the facility was based on 75,000 cubic feet of material per year. This volume is greater than the expected actual volume, because it is conservatively assumed that the compactor operates on two 10-hour extended shifts (instead of 8-hour days) per day, 250 days per year. This assumption was made for the purpose of providing conservative environmental analyses only.

5.1 AIRBORNE EFFLUENTS

The radiological environmental impacts that result from normal operation of the waste-processing facility are discussed here. The major release pathway for atmospheric dispersion of airborne effluent is the compactor exhaust. During compactor operations, the contents of the container are put under pressure and therefore small quantities of waste may escape into the enclosure. As a result, some radioactive material in the container may be entrained as air is released from the container. For the purposes of this environmental assessment, a conservative release fraction (0.01 percent) is used. This release fraction is the same used in a recent environmental assessment for compactor operations.[4] The HEPA filter provides a decontamination factor of 1000 for particulates. However, tritium and carbon-14 are assumed to pass through the filter system.

The maximum concentration of radioactive material at the nearest offsite location was calculated by selecting the area with the highest average annual dispersion (X/Q) value. This represents the highest concentration of airborne radioactive material in an unrestricted area. The annual average dispersion values were estimated based on regional meteorological data.[5] The X/Q for the closest point at the site boundary is about 1E-03 sec/m^3 and for the nearest resident is 3E-05 sec/m^3.

Offsite concentrations of radioactive material in air were calculated for the nearest offsite location (90 meters north) and for the location of the nearest residence (300 meters north). Tables 5-1 and 5-3 show that the offsite concentrations are only a small fraction of the maximum permissible

TABLE 5-1. ANNUAL ALARON COMPACTOR AIRBORNE RELEASES AND OFFSITE CONCENTRATIONS (90 m North)

Nuclide	Total Throughput* (Ci/yr)	Release Fraction**	Annual Emission (Ci)	X/Q (sec/m³)	Offsite Concentration (Ci/m³)	Maximum Permissible Concentration (uCi/ml)	Percent MPC %
H-3	2.88E-02	1.00E-04	2.88E-06	2.65E-04	2.42E-17	2.00E-07	0.0000000%
C-14	7.21E-03	1.00E-04	7.21E-07	2.65E-04	6.06E-18	1.00E-07	0.0000000%
Cr-51	2.40E-03	1.00E-07	2.40E-10	2.65E-04	2.02E-21	8.00E-08	0.0000000%
Mn-54	4.04E-01	1.00E-07	4.04E-08	2.65E-04	3.39E-19	1.00E-09	0.0000000%
Fe-55	6.01E+00	1.00E-07	6.01E-07	2.65E-04	5.05E-18	3.00E-08	0.0000000%
Ni-59	4.16E-01	1.00E-07	4.16E-08	2.65E-04	3.49E-19	3.00E-08	0.0000000%
Ni-63	1.00E+00	1.00E-07	1.00E-07	2.65E-04	8.44E-19	1.00E-08	0.0000000%
Co-58	8.41E-02	1.00E-07	8.41E-09	2.65E-04	7.07E-20	2.00E-09	0.0000000%
Co-60	8.89E+00	1.00E 07	8.89E-07	2.65E-04	7.47E-18	3.00E-10	0.0000025%
Zn-65	1.13E+00	1.00E-07	1.13E-07	2.65E-04	9.49E-19	2.00E-09	0.0000000%
Ag-110m	4.33E-02	1.00E-07	4.33E-09	2.65E-04	3.64E-20	3.00E-10	0.0000000%
Cs-134	1.20E-01	1.00E-07	1.20E-08	2.65E-04	1.01E-19	4.00E-10	0.0000000%
Cs-137	1.81E+00	1.00E-07	1.81E-07	2.65E-04	1.52E-18	5.00E-10	0.0000003%
Pu-241	2.40E-03	1.00E-07	2.40E-10	2.65E-04	2.02E-21	2.00E-14	0.0000101%
DU-238	4.33E-02	1.00E-07	4.33E-09	2.65E-04	3.64E-20	5.00E-12	0.0000007%
Totals	2.00E+01		5.42E-06				0.0000138%

* Throughput based on estimated increase in DAW incoming activity.
** 0.01 percent activity released during compaction and 99.9 percent particulated filter efficiency.

TABLE 5-2

ANNUAL INHALATION DOSE TO THE NEAREST INDIVIDUAL AT AN OFFSITE LOCATION (90 m NORTH) FROM NORMAL COMPACTOR OPERATIONS

Nuclide	Activity* Inhaled (mCi)	Dose Conversion Factor** (Rem/50yr-mCi)	Effective Dose (Rem/50yr)
H-3	1.94E-10	3.20E+01	6.21E-09
C-14	4.85E-11	2.06E+00	9.99E-11
Cr-51	1.62E-14	2.64E-01	4.27E-15
Mn-54	2.71E-12	6.17E+00	1.68E-11
Fe-55	4.04E-11	9.25E-01	3.74E-11
Ni-59	2.80E-12	6.17E-01	1.72E-12
Ni-63	6.75E-12	1.85E+00	1.25E-11
Co-58	5.66E-13	6.17E+00	3.49E-12
Co-60	5.98E-11	1.85E+02	1.11E-08
Zn-65	7.60E-12	1.85E+01	1.41E-10
Ag-110m	2.91E-13	6.17E+01	1.79E-11
Cs-134	8.08E-13	4.63E+01	3.74E-11
Cs-137	1.22E-11	3.08E+01	3.74E-10
Pu-241	1.62E-14	9.23E+03	1.49E-10
DU-238	2.91E-13	9.25E+04	2.69E-08
			1.76E-08

* Breathing rate = 8.00E+03 m^3/yr.
** ICRP 30.

TABLE 5-3. ANNUAL ALARON COMPACTOR AIRBORNE RELEASES AND OFFSITE CONCENTRATIONS (300 m North)

Nuclide	Total Throughput* (Ci/yr)	Release Fraction**	Annual Emission (Ci)	X/Q (sec/m^3)	Offsite Concentration (Ci/m^3)	Maximum Permissible Concentration (uCi/ml)	Percent MPC (%)
H-3	2.88E-02	1.00E-04	2.88E-06	2.78E-05	2.54E-18	2.00E-07	0.0000000%
C-14	7.21E-03	1.00E-04	7.21E-07	2.78E-05	6.36E-19	1.00E-07	0.0000000%
Cr-51	2.40E-03	1.00E-07	2.40E-10	2.78E-05	2.12E-22	8.00E-08	0.0000000%
Mn-54	4.04E-01	1.00E-07	4.04E-08	2.78E-05	3.56E-20	1.00E-09	0.0000000%
Fe-55	6.01E+00	1.00E-07	6.01E-07	2.78E-05	5.30E-19	3.00E-08	0.0000000%
Ni-59	4.16E-01	1.00E-07	4.16E-08	2.78E-05	3.67E-20	3.00E-08	0.0000000%
Ni-63	1.00E+00	1.00E-07	1.00E-07	2.78E-05	8.86E-20	1.00E-08	0.0000000%
Co-58	8.41E-02	1.00E-07	8.41E-09	2.78E-05	7.42E-21	2.00E-09	0.0000000%
Co-60	8.89E+00	1.00E-07	8.89E-07	2.78E-05	7.84E-19	3.00E-10	0.0000003%
Zn-65	1.13E+00	1.00E-07	1.13E-07	2.78E-05	9.96E-20	2.00E-09	0.0000000%
Ag-110m	4.33E-02	1.00E-07	4.33E-09	2.78E-05	3.81E-21	3.00E-10	0.0000000%
Cs-134	1.20E-01	1.00E-07	1.20E-08	2.78E-05	1.06E-20	4.00E-10	0.0000000%
Cs-137	1.81E+00	1.00E-07	1.81E-07	2.78E-05	1.59E-19	5.00E-10	0.0000000%
Pu-241	2.40E-03	1.00E-07	2.40E-10	2.78E-05	2.12E-22	2.00E-14	0.0000011%
DU-238	4.33E-02	1.00E-07	4.33E-09	2.78E-05	3.81E-21	5.00E-12	0.0000001%
Totals	2.00E+01		5.42E-06				0.0000014%

* Throughput based on estimated increase in DAW incoming activity.

** 0.01 percent activity released during compaction and 99.9 percent particulated filter efficiency.

TABLE 5-4

ANNUAL INHALATION DOSE TO THE NEAREST OFFSITE RESIDENT (300 m NORTH) FROM NORMAL COMPACTOR OPERATIONS

Nuclide	Activity* Inhaled (mCi)	Dose Conversion Factor** (Rem/50yr-mCi)	Effective Dose (Rem/50yr)
H-3	2.03E-11	3.20E+01	6.51E-10
C-14	5.09E-12	2.06E+00	1.05E-11
Cr-51	1.70E-15	2.64E-01	4.48E-16
Mn-54	2.85E-13	6.17E+00	1.76E-12
Fe-55	4.24E-12	9.25E-01	3.92E-12
Ni-59	2.93E-13	6.17E-01	1.81E-13
Ni-63	7.09E-13	1.85E+00	1.31E-12
Co-58	5.93E-14	6.17E+00	3.66E-13
Co-60	6.27E-12	1.85E+02	1.16E-09
Zn-65	7.97E-13	1.85E+01	1.47E-11
Ag-110m	3.05E-14	6.17E+01	1.88E-12
Cs-134	8.48E-14	4.63E+01	3.92E-12
Cs-137	1.27E-12	3.08E+01	3.93E-11
Pu-241	1.70E-15	9.23E+03	1.56E-11
DU-238	3.05E-14	9.25E+04	2.82E-09
			1.85E-09

* Breathing rate = 8.00E+03 m^3/yr.
** ICRP 30.

concentration specified in Appendix B, Table II of 10 CFR Part 20. Tables 5-2 and 5-4 show the radiation dose associated with breathing air at these calculated concentrations.

The dose to the maximally exposed individual located at the nearest residence, due to emissions for all environmental pathways, was assessed. The maximally exposed individual is determined to be located about 300 meters north from the site. These radiological dose calculations were based on analyses completed for similar compactor operations. The information used to calculate the maximum dose assumed that the maximally exposed individual received an exposure 24 hours per day, 7 days a week, for the entire year. The estimated whole body dose for all pathways is less than 2E-06 mrem per year. This dose is a negligible fraction of the background radiation dose, NRC's limits (10 CFR Part 20), and the U.S. Environmental Protection Agency's (EPA's) limits (40 CFR Part 61).

5.2 RADIATION EXPOSURE TO WORKERS

ALARON must comply with the provisions of 10 CFR Part 20 which limits radiation exposure to workers to five rem per year. In addition, ALARON has its own requirements for limitation of radiation exposure as far below the NRC limit as practicable. ALARON has established an administrative whole body exposure limit of 300 mrem per month. Occupational exposure for current operations is less than 30 mrem per month per person. Additionally, ALARON conducts an health physics and as low as reasonably achievable (ALARA) review before any tasks are performed in a high radiation area.

Presently 61 people are employed in some capacity to operate ALARON's waste handling/processing facility. Occupational radiation exposure breaks down into two types of worker groups:

1) Warehouse workers (58) - The average personnel exposure for this group will be approximately 40 mrem per month.

2) Administrative personnel (3) - Each receives less than 10 mrem per month.

Using the current waste throughput data, the average activity per drum of compacted waste is 2.96 millicuries. The isotopes involved are mainly gamma emitters and therefore contribute to the whole body dose. The dose rate while compacting waste is expected to be 1.15 mrem per hour, with an occupational exposure of 5.75 rem annually based on a twenty hour operation per day for 250 hours per year. Current operations result in an annual occupational dose per person of 0.345 rem. This amount represents an average from January 1988 through December 1988. Assuming current staffing with the additional processing of DAW, an increase of 0.117 rem per person per year (10 mrem per month) is calculated as follows:

$$\frac{\text{Compaction 5.75 rem + Segregation 1.012 rem}}{\text{58 current number of employees}} = 0.117 \text{ rem}$$

Conservatively assuming that the warehouse workers receive approximately 40 mrem/month, the total exposure is expected to be about 27 person-rems per year.

5.3 TRANSPORTATION

The environmental impact of radioactive shipments in all modes of transportation in the United States under regulations in effect as of June 30, 1975 have been previously documented in the "Final Environmental Statement on the Transportation of Radioactive Material by Air and Other Modes" (NUREG-0175).

This section addresses the radiological impacts due to transportation of LLW in the Wampum, Pennsylvania area, based on approximately one truck shipment per month, and for ALARON's proposed acceptance of DAW. Specifically, the impact of one shipment of either incoming waste or outgoing "product" is assessed for the general population and the maximally exposed person. The area over which the impacts are assessed consist of the route from ALARON and the nearest Interstate highway.

This method assumes that the dose rates from the waste shipments are the maximum allowed by regulations in 10 CFR Part 71 (10 mrem per hour at a distance of two meters from the surface of the vehicle), and that the individuals along the route are exposed from passing vehicles and from vehicles at stops.

Based on the total volume of wastes received each month, an estimated one truck per month would be required to ship waste to and from ALARON's warehouse. For the purposes of this assessment, a total of 15 annual truck shipments (1.25 shipments/month x 12 months = 15 shipments per year) was assumed. The route to and from ALARON to the nearest Interstate highway (I-76) is illustrated in Figure 2. A truck would travel about three miles at an average speed estimated at 25 miles per hour (mph).

A summary of the annual doses due to one truck per month is shown in Table 5-5. No credit was taken for either the shielding by structures or the containers. The dose to an individual from the passage of one shipment per month was calculated at 25 and 100 meters. The calculated dose to the population and to the maximally exposed individual is extremely low, and would therefore have no significant impact on the surrounding community.

5.4 DECOMMISSIONING

Because a large part of ALARON's current operations include the decontamination of metals and contaminated equipment, ALARON appears to have the personnel, skills and equipment necessary to perform the decommissioning of its present location, when required.

TABLE 5-5

SUMMARY OF ANNUAL DOSES FROM TRANSPORT[6]

	Distance from Truck Shipment at 40 kph (25 mph)	
	25 meters	100 meters
Maximum Individual	1.4×10^{-4} mrem	3.41×10^{-5} mrem
Population Dose*	4.05×10^{-2} person-rem	

*The population dose was calculated by considering the integrated dose at several intervals (within a half mile of the route) between 100 and 2500 feet from the centerline of the right of way.

6.0 DESCRIPTION OF ENVIRONMENTAL MONITORING PROGRAMS

The environmental monitoring programs are briefly described below. These programs are already in existence, as required by the licence. All aspects of these systems are designed to keep exposures ALARA.

Within ALARON Corporation's main process building, there exist several smaller containment enclosures, including glove box abrasive blast units, tents, and a free-standing metal building. Each of these internal structures is independently ventilated with HEPA filtering systems, and the effluents are continuously monitored. The discharge exhaust ports from each independent ventilation system is vented within the main process building, at various points. On the average, exhaust ports are located approximately 15 feet above the building's floor. Building air exits naturally through personnel and equipment doorways.

Whenever waste reduction or monitoring activities are conducted in the warehouse or adjacent areas, both wipe and radiation instrument surveys for removable contamination are performed daily or hourly, depending on the RWP. In addition, air is continuously sampled and monitored immediately above the compactor door and in the containment areas, to check for contamination of radioactive effluent into the environment. ALARON has developed radiation safety procedures for all aspects of the effluent monitoring and survey requirements, at its facility. The frequency, types of radiation monitoring equipment, and methods of surveying are outlined in ALARON Document RSF-HP-2, "Survey and Posting Requirements at the ALARON Regional Service Facility."

7.0 IMPACTS OF POTENTIAL ACCIDENTS

For the purposes of environmental analysis, several accident scenarios have been selected to conservatively bound a spectrum of potential accidents that could occur. Potential scenarios other than those discussed would be also possible, but the consequences of these are expected to be lower. The described scenarios are considered conservative in terms of both accident potential and radiological consequences.

In assessing potential accidents, two major factors were considered to developing a series of postulated accidents: the probability of occurrence and the subsequent severity of an accident. A complete range of postulated accidents was described in ALARON's application for an amendment to its license for the proposed operations. These included a tornado, flood, liquid spills, and an area fire accident in the waste-handling area. In addition, a complete discussion of equipment and facilities available to contain these accidents, as well as methods of medical transportation and treatment were presented.

The radiological impact of accidents reviewed in the following sections are summarized in Tables 7-1 and 7-2. The doses calculated for these accidents are effective committed dose equivalents resulting from the inhalation of dispersed radioactive material. Exposure pathways other than inhalation can be expected to result in minor increases in dose commitment received. Deposition of particular radioisotopes in soil and/or vegetables may require decontamination in the event that the accident involves significant amounts of these isotopes. ALARON, in order to prevent such occurrences as a fire or safety hazard, has developed an Industrial Safety Department comprised of an Industrial Safety Officer and three assistants. This department is responsible for the identification of safety deficiencies, prospective and retrospective remedial actions, surprise audits, Occupational Safety and Health Administration (OSHA) compliance, and fire prevention.

7.1 AREA FIRE

A fire could occur in any of the staging areas. The facility design includes an automatic detection system to give early warning of any fires. In January 1989, ALARON adopted Safety Procedure RSF-OP-210 which addresses the industrial safety hazards associated with the welding, burning and grinding operations in the decontamination process. In addition, ALARON has increased communications with the local fire departments, to discuss future and continued training drills.

The total radioactive inventory is not involved in this accident, and only 0.3 percent (or about one trailer load) is assumed to be ignited and to release airborne radioactive effluent. This fraction was chosen because a sequence of events that would result in the complete combustion of all the wastes is unlikely. This assumption takes into consideration the waste form, the packaging, and the methods of storage (Sea-Van containers, 52- or 55- gallon steel drums, contained inside a metal building).

The accidental release of radioactivity from ground level and transported in the atmosphere under stable conditions was calculated at one meter per second.

U.S. NRC Regulatory Guide 1.145 was used to calculate the average value of X/Q at 50 and 300 meters from the warehouse for releases through building penetrations. Based on studies of estimates in fly ash production in incinerators, 1.5 percent of the inventory affected was assumed to be released to the atmosphere.[7]

TABLE 7-1. OFFSITE DOSE AT THE SITE BOUNDARY (50 m) DUE TO AN ACCIDENTAL FIRE

Nuclide	0.3% Of Total Inventory (Ci)	Fraction Released (%)	Offsite Concentration* (Ci/m3)	Percent MPC (%)	Amount Inhaled (mCi)	Dose Conversion Factor** (Rem/50yr-mCi)	Effective Dose (Rem/50yr)
H-3	1.05E-02	100.00%	6.79E-09	3.39E-02	3.10E-06	3.20E+01	9.92E-05
C-14	1.40E-03	100.00%	9.05E-10	9.05E-03	4.13E-07	2.06E+00	8.51E-07
Cr-51	2.34E-04	1.50%	2.26E-12	2.83E-05	1.03E-09	2.64E-01	2.73E-10
Mn-54	1.63E-02	1.50%	1.57E-10	1.57E-01	7.18E-08	6.17E+00	4.43E-07
Fe-55	1.98E-01	1.50%	1.92E-09	6.39E-02	8.75E-07	9.25E-01	8.09E-07
Ni-59	4.80E-02	1.50%	4.64E-10	1.55E-02	2.12E-07	6.17E-01	1.31E-07
Ni-63	7.50E-02	1.50%	7.25E-10	7.25E-02	3.31E-07	1.85E+00	6.12E-07
Co-58	7.02E-03	1.50%	6.79E-11	3.39E-02	3.10E-08	6.17E+00	1.91E-07
Co-60	4.10E-01	1.50%	3.96E-09	1.32E+01	1.81E-06	1.85E+02	3.35E-04
Zn-65	1.23E-01	1.50%	1.19E-09	5.95E-01	5.44E-07	1.85E+01	1.01E-05
Ag-110m	4.33E-03	1.50%	4.18E-11	1.39E-01	1.91E-08	6.17E+01	1.18E-06
Cs-134	1.49E-02	1.50%	1.44E-10	3.59E-01	6.56E-08	4.63E+01	3.04E-06
Cs-137	1.87E-01	1.50%	1.81E-09	3.61E+00	8.25E-07	3.08E+01	2.54E-05
Pu-241	2.34E-04	1.50%	2.26E-12	1.13E+02	1.03E-09	9.23E+03	9.53E-06
DU-238	1.54E-02	1.50%	1.49E-10	2.99E+01	6.82E-08	9.25E+04	6.31E-03
Totals	1.11E+00			1.47E+01			4.51E-04

* Location at 50 m, X/Q = 1.16E-03.
** ICRP Publication 30.

TABLE 7-2. OFFSITE DOSE AT THE NEAREST RESIDENCE (300 m) DUE TO AN ACCIDENTAL FIRE

Nuclide	0.3% Of Total Inventory (Ci)	Fraction Released (%)	Offsite Concentration* (Ci/m^3)	Percent MPC (%)	Amount Inhaled (mCi)	Dose Conversion Factor** (Rem/50yr-mCi)	Effective Dose (Rem/50yr)
H-3	1.05E-02	100.00%	1.63E-10	8.13E-04	7.43E-08	3.20E+01	2.38E-06
C-14	1.40E-03	100.00%	2.17E-11	2.17E-04	9.90E-09	2.06E+00	2.04E-08
Cr-51	2.34E-04	1.50%	5.42E-14	6.78E-07	2.48E-11	2.64E-01	6.53E-12
Mn-54	1.63E-02	1.50%	3.77E-12	3.77E-03	1.72E-09	6.17E+00	1.06E-08
Fe-55	1.98E-01	1.50%	4.59E-11	1.53E-03	2.10E-08	9.25E-01	1.94E-08
Ni-59	4.80E-02	1.50%	1.11E-11	3.70E-04	5.07E-09	6.17E-01	3.13E-09
Ni-63	7.50E-02	1.50%	1.74E-11	1.74E-03	7.93E-09	1.85E+00	1.47E-08
Co-58	7.02E-03	1.50%	1.63E-12	8.13E-04	7.43E-10	6.17E+00	4.58E-09
Co-60	4.10E-01	1.50%	9.50E-11	3.17E-01	4.34E-08	1.85E+02	8.02E-06
Zn-65	1.23E-01	1.50%	2.85E-11	1.43E-02	1.30E-08	1.85E+01	2.41E-07
Ag-110m	4.33E-03	1.50%	1.00E-12	3.34E-03	4.58E-10	6.17E+01	2.83E-08
Cs-134	1.49E-02	1.50%	3.44E-12	8.61E-03	1.57E-09	4.63E+01	7.28E-08
Cs-137	1.87E-01	1.50%	4.33E-11	8.66E-02	1.98E-08	3.08E+01	6.09E-07
Pu-241	2.34E-04	1.50%	5.42E-14	2.71E+00	2.48E-11	9.23E+03	2.28E-07
DU-238	1.54E-02	1.50%	3.58E-12	7.16E-01	1.63E-09	9.25E+04	1.51E-04
Totals	1.11E+00			3.52E-01			1.08E-05

* Location at 300 m, X/Q = 2.78E-05.
** ICRP Publication 30.

Tables 7-1 and 7-2 summarize the offsite inhalation doses from DAW waste at 50, and 300 meters, respectively from the release point. The resulting maximum inhalation doses at these distances are about 4.5E-04 rem and 1.1E-05 rem, respectively. The total percent MPC for these two scenarios (14.7 percent and 0.35 percent) are still within the allowable maximum permissible limits for normal operations.

This scenario assumes that all the shielding materials are destroyed and the contaminated metals resemble a point configuration. The average monthly inventory used for these calculations is eight curies. The dose rate at 10 meters, a reasonable distance for fire control and containment, is approximately 105 mrem per hour. For a maximum fire fighting time of three hours, the total dose to an individual would be approximately 315 mrem, which is well within the Protective Action Guidelines of 25 rem for emergency workers. ALARON has implemented fire protection and emergency preparedness plans.

7.2 TORNADO

The most severe weather conditions expected at the ALARON facility are tornados. This region is classified by the NRC as being in Tornado Intensity Region I, as defined by U.S. NRC Regulatory Guide 1.76 [8] The ALARON application discussed the probability of occurrence and the impact of tornadoes on its facility. The scenario assumes that scattered drums containing radioactive LLW would rupture upon impact and result in a release of materials that would not be readily dispersible, due to the solid form of the LLW. The airborne concentration due to such an accident is estimated to be small, and any resulting contamination could be readily decontaminated.

8.0 ALTERNATIVES

Alternatives to the proposed action are mainly waste management options. There are several alternatives to radioactive waste reduction and volume control. One possible alternative would be to continue present practices. Individual waste generators would ship only their metal waste directly to ALARON, and only decontamination would take place. The disposal of unreduced or only slightly reduced material would preclude releases of radioactive material to the atmosphere that would result from the volume reduction process. In NRC's October 1981 Policy Statement on Low-Level Radioactive Waste Volume Reduction (46 FR 51100), (see Ref. 9) it states:

> "The NRC considers it desirable that licensees reduce the volume of low-level radioactive waste generated and shipped to commercial waste disposal sites. Such action would:
>
> 1. Extend the operational lifetime of the existing low-level disposal sites;
>
> 2. Alleviate concern for adequate storage capacity if there are delays in establishing additional regional sites; and
>
> 3. Reduce the number of waste shipments."

In addition, NRC believes "it is in the best interest of the licensees and the public that licensees extensively explore means by which waste volume may be reduced."[9] Also in January 1986, amendments to the 1980 Low-Level Radioactive Waste Policy Act were enacted. One of the most significant impacts of this Act is the limit that is put on the amount of waste that can be disposed in the existing LLW disposal sites.

Waste generators could perform their own volume reduction as an alternative to a volume reduction facility. Some generators now operate their own reduction processes; however, many cannot economically justify the operation of such a process due to the considerable amount of time and effort needed to run these types of operations.

None of the aforementioned waste management options discussed above are clearly superior to ALARON's waste brokerage service, with decontamination and its proposed acceptance of DAW from other facilities. Because there are no measurable impacts associated with the proposed action, any alternative with equal or greater environmental impacts need not be evaluated.

The other alternative would be to not to amend the license to accept DAW. By taking no action, the benefit of extending the operational lifetime of existing disposal sites and in the saving in number of shipments reduced to disposal sites would be lost.

9.0 ALTERNATIVE USE OF RESOURCES

The only irreversible commitment of resources determined in this assessment was that resulting from the use of fuels to transport the waste. This commitment of resource has, in NUREG-0170, been found to be negligibly small. The incremental amount used to transport LLW to ALARON's facility is expected to be offset by the savings realized by reducing the number of shipments to the disposal sites. Savings in land resources can be realized from extended operational lifetimes of disposal sites caused by disposing of volume-reduced LLW.

10.0 AGENCIES AND PERSONS CONSULTED

No persons or agencies outside of PADER or NRC were contacted in connection with the preparation of this environmental assessment.

11.0 SUMMARY AND CONCLUSIONS

The environmental impacts of operating the ALARON waste brokerage facility for acceptance of DAW are expected to be negligible. For all nuclides, the plant-site boundary nuclide concentrations resulting from normal operations are calculated to be far below the maximum concentrations specified in 10 CFR Section 20.106.

10 CFR Section 20.105 effectively limits the whole body dose received by any individual in an unrestricted area to 0.5 rem per calendar year. In addition to the limits specified in 10 CFR Part 20, the EPA Clean Air Act Standard in 40 CFR Part 61 limits individuals to 25 mrem per whole body dose and 75 mrem per year to the thyroid for members of the public. The estimated whole body dose for the maximally exposed individual (due to compactor operations) for all pathways was calculated to be less than 2E-06 mrem per year. A conservative estimate for the annual exposure for the workers is 27 person-rem. The maximally exposed person from normal transportation activities would receive an annual exposure of 1.4E-04 mrem per year. Normal background radiation for this area is approximately 300 mrem per year.

The effective dose to the maximally exposed individual at the site boundary is about 4.5E-01 mrem. ALARON has fire protection and emergency preparedness plans already implemented in their radiological contingency plans.

The following are the findings and recommendations resulting from this Environmental Assessment:

1. Operation of the waste reduction, decontamination and compactions activities are consistent with local land-use patterns. ALARON is already located within an existing industrial development complex, and there are no anticipated construction activities that would disrupt the flow of traffic.

2. The operation of the facility is consistent with the NRC policy statement to reduce the amount of waste requiring disposal.

Based on this environmental assessment, NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Therefore, a finding of no significant impact is appropriate, and the preparation of an environmental impact statement is not warranted.

REFERENCES*

1. U.S. NRC Regulatory Guide, 1.76. "Design Basis Tornado for Nuclear Power Plants," April 1974.

2. Duquesne Light Company, "Updated Final Safety Analysis Report for Beaver Valley Power Station-Unit 2," Shippingport Borough, Pennsylvania, Docket No. 050-00412, May 1988.

3. NCRP Report Number 94. "Exposure of the Population in the United States and Canada from Natural Background Radiation," Woodmont Avenue, Bethesda, Maryland, December 1987.

4. Babcock and Wilcox, "Environmental Assessment of Babcock and Wilcox Volume Reduction Services Facility," Parks Township, Pennsylvania, Docket 70-364, March 1986.

5. ibid., Ref. 2.

6. Eichholz, G.G. Environmental Aspects of Nuclear Power, Lewis Publishers, Inc., Chelsea, Michigan, 1985.

7. Exxon Nuclear Company, Inc., Nuclear Fuel Recovery and Recycling Center, "Preliminary Safety Analysis Report," Docket 50-564, Appendix 9A.

8. ibid., Ref. 1.

9. Federal Register, Vol 46, No. 200, "1981 Policy Statement on Low-Level Waste Volume Reduction," October 16, 1981.

*All references (except 6) are available at the NRC Public Document Room, 2120 L Street NW., Washington, DC 22055.

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